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10/020,655	12/11/2001	Jason Naxin Wang	80398P468	2853

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EXAMINER	
VO, TUNG T	

ART UNIT	PAPER NUMBER
2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/020,655	WANG ET AL.	
	Examiner	Art Unit	
	Tung Vo	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12-21,23-30 and 32-39* is/are pending in the application.

4a) Of the above claim(s) *11,22 and 31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12-21,23-30 and 32-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 7-8, 10, 12-13, 18-19, 21, 23, 28-30, 32, and 37-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Lam (EP 0 782 341 A2).

Re claims 1, 12, 28 and 37, Lam discloses a system (fig. 1) comprising: a main memory (page 3, lines 1-2) coupled to the bus for reading and writing instructions to execute a processor;

an interface (12 of fig. 1) coupled to a bus (a connection between the elements 12, 16, and 22 of fig. 1) and to receive a real time video stream (10 of fig. 1) to be encoded by two parallel encoders (16 and 22 of fig. 1) using a parallel macroblock loop (page 2, lines 57-58, e.g. 8x8 pixel blocks are macroblocks, and the architecture of figures 2 and 5 are an MPEG compression loop, page 3, lines 57-58) comprising a first and second group of video encodings tasks (16 and 22 of fig. 1, figs. 2 and 5), wherein the first group of video encoding tasks (22 fig. 1) comprises video encoding tasks (fig. 5) not including variable length encoding tasks (fig. 5, Note the fixed encoding task) and the second group of video encoding tasks (16 of fig. 1) comprises variable length encoding tasks (fig. 2, Note variable encoding tasks);

a main processor (22 of fig. 1) coupled to the bus, the main processor to process a first group of video encoding tasks (fig. 5, Note FIXED LENGTH COMPRESSOR, 22 of fig. 1)

according to a well known standard (page 5, lines 49-50, MPEG standard is well known standard);

a co-processor (16 of fig. 1) coupled to the bus, the co-processor to process the second group of video encoding tasks (fig. 2, Note VARIABLE ENCODING 16 of fig. 1) according the MPEG standard that is well known standard;

wherein the processing of the first group of video encoding tasks is executed substantially concurrently (page 2, lines 37-38; and page 6, line 7) with the processing of the second group of video encoding tasks;

outputting an encoded version of the real time video stream (28 of fig. 1).

Re claims 2, 13, 23, and 32, Lam further discloses wherein the first group of video encoding tasks and the second group of video encoding tasks comprise those tasks required of at least one of the Moving Pictures Expert Group (MPEG) standards for video encoding (page 5, lines 49-53).

Re claims 7, 18, 29, and 38, Lam further discloses wherein the co-processor (16 of fig. 1; fig. 2) is a variable length encoder/decoder co-processor.

Re claims 8, 19, Lam further discloses wherein the interface is at least one of a broadcast interface and a network interface (12 and 28 of fig. 1; page 2, lines 14-15).

Re claims 10, 21, 30, and 39, Lam further discloses wherein the real time video stream is at least one of a television signal received wirelessly and a television stream received via a hardwired connection (page 2, lines 14-16).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3-4, 6, 9, 14-15, 20, 24-25, and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lam (EP 0 782 341 A2) in view of Krishnamurthy et al. (US 6,496,607 B1).

Re claims 3, 9, 14, 20, 24, and 33, Lam further teaches the first group of video encoding tasks (fig. 5) comprises at least rate control (60 of fig. 5), zig zag scanning (55 of fig. 5), inverse quantization computation (58 of fig. 5), quantizer (56 of fig. 5), motion compensation (50 of fig. 5), and the second group of video encoding tasks comprises variable length encoding computation (44 of fig. 2), and macro-block header encoding (page 3, lines 20-23), wherein the interface (12 of fig. 1) receive video data corresponding to a MPEG standard that would obviously have an audio and a video so the interface (12) would be audio and video interface.

It is noted that Lam does not particularly teach the conventional components of MPEG coding/encoding such as a motion estimation, pre-processing, mode selection, forward discrete cosine transform computation, forward quantization computation, inverse discrete cosine transform computation as claimed.

However, Krishnamurthy teaches motion estimation (140 of fig. 1), pre- processing (120 of fig. 1), mode selection (157 of fig. 1), forward discrete cosine transform computation (160 of

fig. 1; col. 6, lines 15-19), forward quantization computation (170 of fig. 1), inverse discrete cosine transform computation (165 of fig. 1).

Taking the combined teachings of Lam and Krishnamurthy as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the teachings of Krishnamurthy to encode the identified region of interest classified by preprocessor.

Doing so would allow the encoder allocating an encoding resource to a block in accordance with the identification of the input.

Re claims 4, 6, 15, 25, and 34, It is noted that the variable length encoding computation of Krishnamurthy would obviously perform motion vector encoding; and discrete cosine transform coefficients encoding, wherein the pre-processor (120 of fig. 1) would obviously use as a part of a variable length encoder/decoder co-processor. Therefore, one skilled in the art would use the teachings of variable length encoding computation including the pre-processor of Krishnamurthy for the variable length compressor (16 of fig. 2) of Lam for efficiency of encoding.

5. Claims 5, 16, 26, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lam (EP 0 782 341 A2) in view of Krishnamurthy et al. (US 6,496,607 B1) as applied to claims 1, 3, 12, 14, 28, 24, 37, and 33, and further in view of Lee (US 6,317,460).

Re claims 5, 16, 26, and 35, the combination of Lam and Krishnamurthy teaches the motion estimation (140 of fig. 1) of Krishnamurthy except a first phase includes top to top searching and bottom to bottom searching, and a second phase includes top to bottom searching and bottom to top searching as claimed.

However, Lee teaches a first phase includes top to top searching and bottom to bottom searching; and a second phase includes top to bottom searching and bottom to top searching (fig. 3).

Therefore, taking the combined teachings of Lam, Krishnamurthy, and Lee as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the top to bottom and the bottom to top searching in motion estimation (fig. 3) of Lee into the motion estimation of the combined system of Lam and Krishnamurthy for accurately performing motion estimation.

Doing so would greatly reduce the computational requirements of motion estimation processing for video encoding schemes.

6. Claims 17, 27, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lam (EP 0 782 341 A2) in view of Krishnamurthy et al. (US 6,496,607 B1) as applied to claims 12, 14, 28, 24, 37, and 33, and further in view of Chu et al (US 5,367,629).

Re claims 17, 27, and 36, the combination of Lam and Krishnamurthy does not particularly the pre-processing comprises noise reduction as claimed.

However, Chu teaches the pre-processing section (102 of fig. 1) employs adaptive temporal filtering and content adaptive noise reduction filtering to provide images with proper smoothness and sharpness to match the encoder characteristics.

Taking the teachings of Lam, Krishnamurthy, and Chu as a whole, it would have been obvious to one of ordinary skill in the art to incorporate the pre-processor (102 of fig. 1) comprises noise reduction of Chu into the pre-processor of the combined system of Lam and

Krishnamurthy to improve the smoothness and sharpness of the video images, pre-processing is performed.

Doing so would provide a video compression system to improve the efficiency of coding and the quality of the video transmitted.

Response to Arguments

7. Applicant's arguments filed 03/03/06 have been fully considered but they are not persuasive.

The applicant argued that Lam discloses creating two different versions of compressed video using two video compressors. Because Lam discloses each compressor producing an independently compressed video stream, Lam cannot be properly interpreted as disclosing encoding a video stream using a parallel macroblock loop as claimed. Therefore, Lam does not teach or suggest the claimed element of encoding a video stream using a parallel macroblock loop comprising two groups of encoding tasks, page 10-11 of the remarks.

The examiner respectfully disagrees with the applicant. It is submitted that Lam discloses two compressors to compress the video stream using a parallel macroblock loop (page 2, lines 37-38, Note the system uses a variable compression network (16 of fig. 1) in parallel with a fixed compression network (22 of fig. 1)), wherein the compression loop (page 3, lines 57-58) compresses macroblocks (page 2, lines 57-58, e.g. 8x8 pixel blocks). Therefore, Lam does disclose the claimed element of encoding (fig. 1) a video stream using a parallel macroblock loop (fig. 1) comprising two groups of encoding tasks (16 and 22 of fig. 1). In view of the discussion above, Lam anticipates the claimed features.

The applicant argued that Lam does not teach or suggest this claimed element, and Krishnamurthy does not teach or suggest encoding a video stream using a parallel macroblock loop as claimed. Therefore, the combination of Lam and Krishnamurthy cannot render obvious applicant's invention as claimed in claims 3-4, 6, 9, 14-15, 20, 24-25 and 33-34, page 11 of the remarks.

The examiner respectfully disagrees with the applicant. It is submitted that Lam teaches two compressors to compress the video stream using a parallel macroblock loop (page 2, lines 37-38, Note the system uses a variable compression network (16 of fig. 1) in parallel with a fixed compression network (22 of fig. 1)), wherein the compression loop (page 3, lines 57-58) compresses macroblocks (page 2, lines 57-58, e.g. 8x8 pixel blocks), so Lam clearly teaches the claimed element of encoding (fig. 1) a video stream using a parallel macroblock loop (fig. 1) comprising two groups of encoding tasks (16 and 22 of fig. 1).

Krishnamurthy teaches motion estimation (140 of fig. 1), pre- processing (120 of fig. 1), mode selection (157 of fig. 1), forward discrete cosine transform computation (160 of fig. 1; col. 6, lines 15-19), forward quantization computation (170 of fig. 1), inverse discrete cosine transform computation (165 of fig. 1), which would be used in the compressors. Therefore, one skilled in the art would combine the suggested teachings of Lam and Krishnamurthy to make obvious the claimed invention.

The applicant further argued that none of Lam, Krishnamurthy, or Lee teach or suggest this element as claimed in claims 1, 12, 28 and 37, and the combination of Lam, Krishnamurthy, and Lee cannot render obvious Applicant's invention as claimed in claims 5, 16, 26 and 35, page 12 of the remarks.

The examiner respectfully disagrees with the applicant. It is submitted that Lam teaches two compressors to compress the video stream using a parallel macroblock loop (page 2, lines 37-38, Note the system uses a variable compression network (16 of fig. 1) in parallel with a fixed compression network (22 of fig. 1)), wherein the compression loop (page 3, lines 57-58) compresses macroblocks (page 2, lines 57-58, e.g. 8x8 pixel blocks), so Lam clearly teaches the claimed element of encoding (fig. 1) a video stream using a parallel macroblock loop (fig. 1) comprising two groups of encoding tasks (16 and 22 of fig. 1). Krishnamurthy teaches motion estimation (140 of fig. 1), pre- processing (120 of fig. 1), mode selection (157 of fig. 1), forward discrete cosine transform computation (160 of fig. 1; col. 6, lines 15-19), forward quantization computation (170 of fig. 1), inverse discrete cosine transform computation (165 of fig. 1), which would be used in the compressors. Furthermore, Lee teaches a first phase includes top to top searching and bottom to bottom searching; and a second phase includes top to bottom searching and bottom to top searching (fig. 3), that would obviously used in the encoding process. Therefore, one skilled in the art would combine the suggested teachings of Lam, Krishnamurthy, and Lee to make obvious the claimed invention.

The applicant argued that none of Lam, Krishnamurthy, or Chu, teach or suggest this element as claimed in claims 12, 28, and 37, and the combination of Lam, Krishnamurthy, and Chu cannot render obvious Applicant's invention as claimed in claims 17, 27 and 36, page 13 of the remarks.

The examiner respectfully disagrees with the applicant. It is submitted that Lam teaches two compressors to compress the video stream using a parallel macroblock loop (page 2, lines 37-38, Note the system uses a variable compression network (16 of fig. 1) in parallel with a

fixed compression network (22 of fig. 1)), wherein the compression loop (page 3, lines 57-58) compresses macroblocks (page 2, lines 57-58, e.g. 8x8 pixel blocks), so Lam clearly teaches the claimed element of encoding (fig. 1) a video stream using a parallel macroblock loop (fig. 1) comprising two groups of encoding tasks (16 and 22 of fig. 1). Krishnamurthy teaches motion estimation (140 of fig. 1), pre- processing (120 of fig. 1), mode selection (157 of fig. 1), forward discrete cosine transform computation (160 of fig. 1; col. 6, lines 15-19), forward quantization computation (170 of fig. 1), inverse discrete cosine transform computation (165 of fig. 1), which would be used in the compressors. Moreover, the pre-processing section (102 of fig. 1) employs adaptive temporal filtering and content adaptive noise reduction filtering to provide images with proper smoothness and sharpness to match the encoder characteristics to improve the smoothness and sharpness of the video images. Therefore, one skilled in the art would combined the suggested teachings of Lam, Krishnamurthy, and Chu to make obvious the claimed invention.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung Vo whose telephone number is 571-272-7340. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tung Vo
Primary Examiner
Art Unit 2621